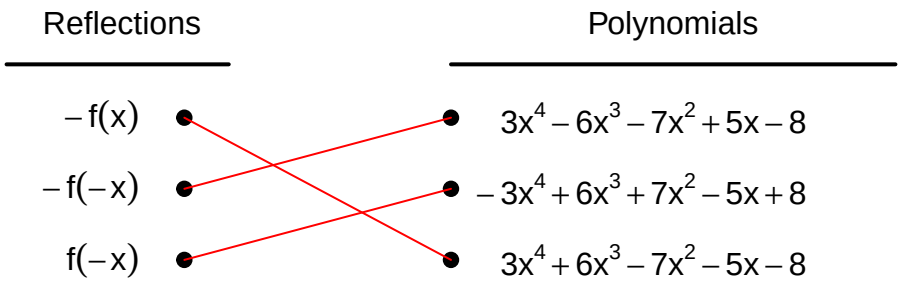
Name: Date:

Exam: Function Reflections (Solution version 6)

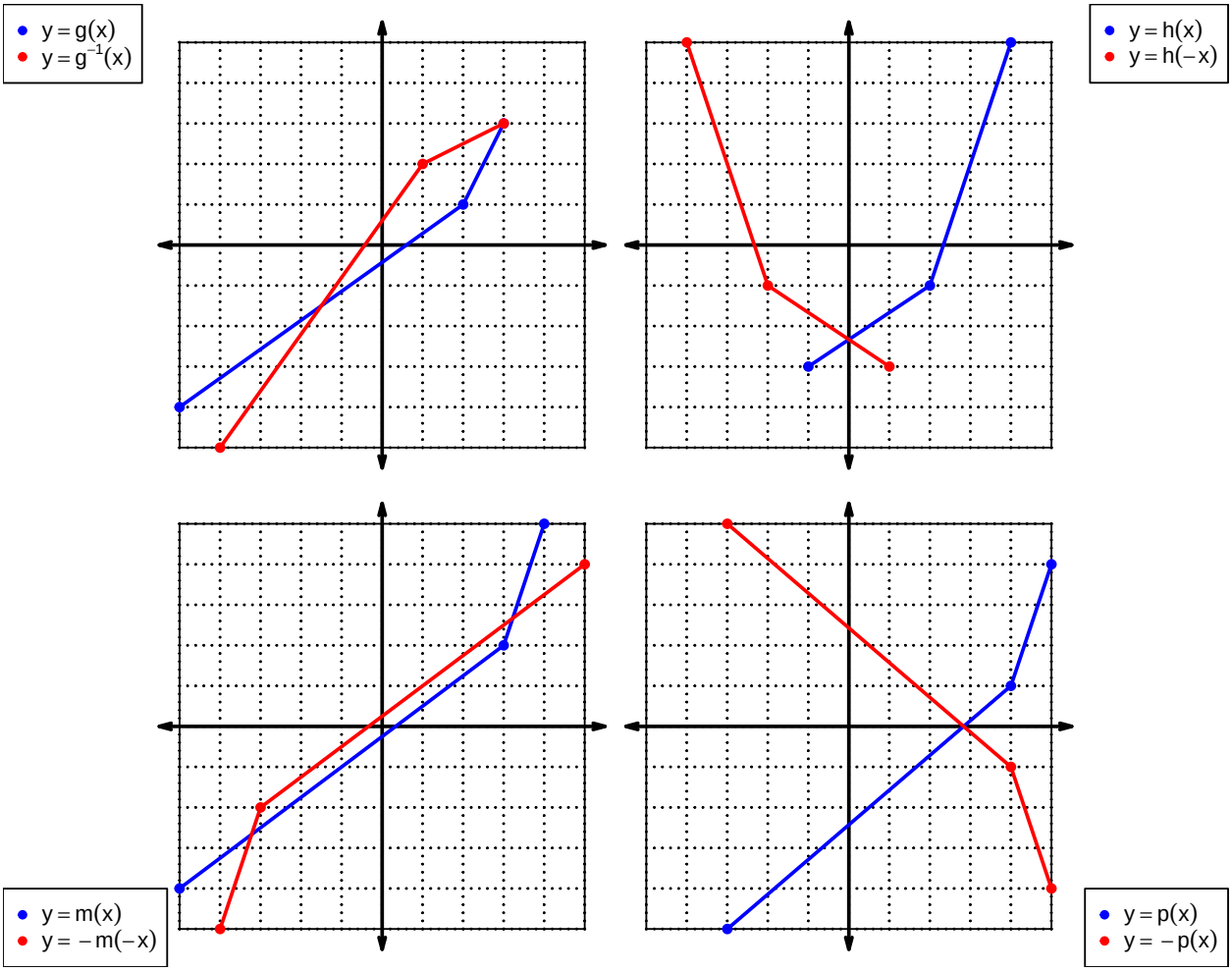
1. Let function f be defined by the polynomial below:

$$f(x) = -3x^4 - 6x^3 + 7x^2 + 5x + 8$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	7	2	3
2	1	9	7
3	4	3	6
4	8	5	2
5	2	7	4
6	5	8	1
7	9	6	8
8	3	1	5
9	6	4	9

3. Evaluate $h(5)$.

$$h(5) = 4$$

4. Evaluate $f^{-1}(3)$.

$$f^{-1}(3) = 8$$

5. By filling more rows of the table, it is possible to make function f **even**. If that were done, what would be the value of $f(-6)$?

If function f is even, then

$$f(-6) = 5$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-7)$?

If function g is odd, then

$$g(-7) = -6$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^3 + (-x)$$
$$p(-x) = -x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^3 - x\right)$$
$$-p(-x) = x^3 + x$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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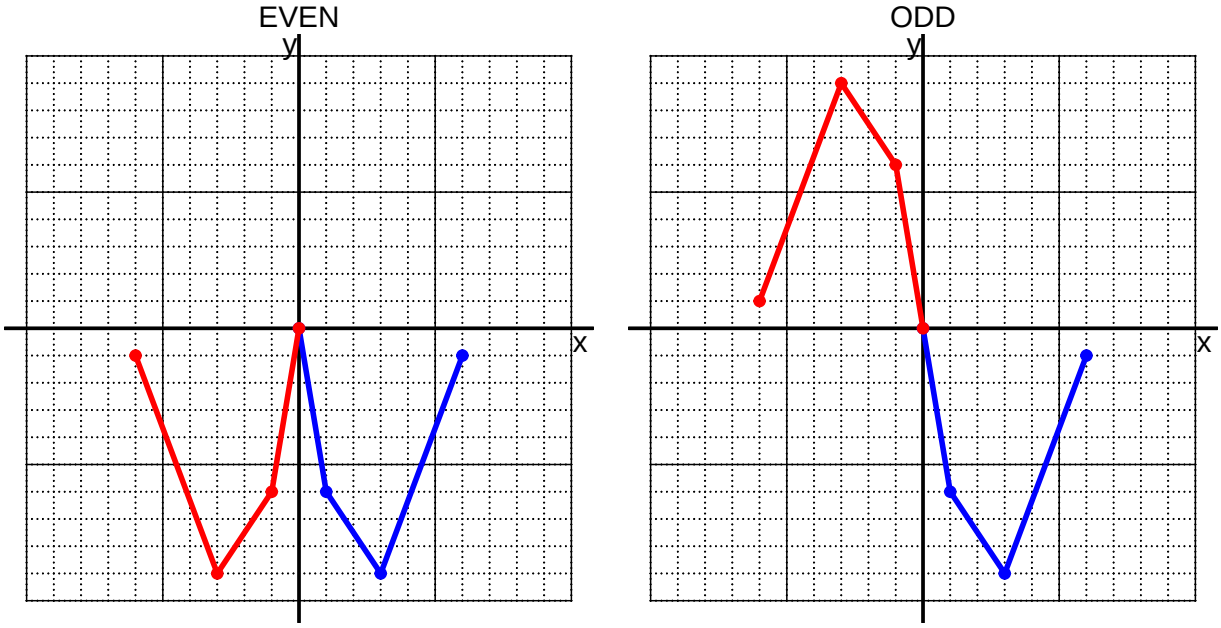
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{5} - 7$$

a. Evaluate $f(95)$.

step 1: divide by 5
step 2: subtract 7

$$f(95) = \frac{(95)}{5} - 7$$
$$f(95) = 12$$

b. Evaluate $f^{-1}(9)$.

step 1: add 7
step 2: multiply by 5

$$f^{-1}(x) = 5(x + 7)$$
$$f^{-1}(9) = 5((9) + 7)$$
$$f^{-1}(9) = 80$$

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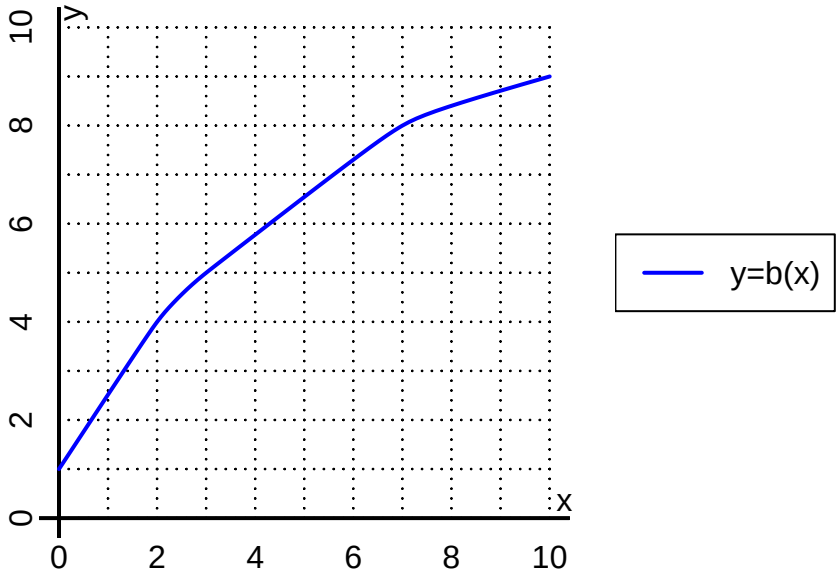
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$b(2) = 4$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 3$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	-5	5
-1	-9	9	9	-9
0	0	0	0	0
1	9	-9	-9	9
2	-5	5	-5	5

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.